



Replacement of a Premolar Tooth with a Resin-bonded Bridge: A Case Report

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Abstract

This case report describes a resin-bonded bridge with a specific design of minimal tooth. A patient came to a dental clinic for a fixed replacement of her upper left premolar tooth. Adjacent teeth are sound clinically. It is very challenging to prepare the adjacent teeth as conservatively as possible without compromising the bond of the bridge to the tooth structure. The patient was delighted with the treatment outcome. The survival rate of resin-bonded bridge remains uncertain. Case selection, bridge design, and clinical and laboratory procedures may become the crucial factors in increasing the outcome.

Keywords: Resin-Bonded Bridge; Esthetics; Edentulous

Introduction

Thirty years ago, a resin-bonded bridge became one of the conservative solutions to replace a short edentulous space. The reason of esthetics and function of the bridge has statistically improved patients' quality of life [1].

It is very challenging for patients to decide on either a resin-bonded bridge or a dental implant to replace one missing tooth [2]. A resin-bonded bridge is one type of fixed partial denture. A dental implant is usually used as an alternative for patients with bridges.

A resin-bonded bridge is indicated to replace a single missing anterior tooth, such as an incisor or canine. Replacement of a posterior tooth, either premolar or molar, is not common due to a higher biting pressure. However, replacing the premolar tooth is required to maintain the space following the further treatment such as orthodontic treatment or dental implant. For example, a young patient's appearance could be affected when missing a premolar tooth. According

to Lim and Ariff, patients satisfied with the survey performed for a single missing tooth either by a resin-bonded bridge or dental implant [3]. Nevertheless, a resin-bonded bridge is contraindicated to heavily restored abutment teeth and unfavorable occlusion [4].

There are various ceramic systems available these days. However, metal-ceramic restorations are still widely used. In this case report, the resin-bonded bridge is the treatment of choice, and it is also a metal-ceramic type. The study aimed to improve rehabilitation using metal-ceramic restoration of the resin-bonded bridge with a specific design of minimal tooth preparation and to discuss about the treatment of choice to replace an upper premolar tooth.

Case Presentation

A 30-year-old Malay female came to a dental clinic for a fixed replacement of her upper left premolar tooth. The tooth was extracted due to decay. After discussion, the patient

agreed for a resin-bonded bridge instead of a single implant. The patient is healthy and excited to have an immediate replacement. The patient was informed regarding of any complications after treatment. It is very challenging to prepare the adjacent tooth, that is, the upper left canine and upper left second premolar (Figure 1) as conservative as possible without compromising the bond of the bridge to the tooth structure.

The general appearance and the patient's oral hygiene are good on examination. The adjacent teeth are sound clinically, and no abnormalities were detected. The patient has a deep overbite of approximately 4 mm with 3 mm overjet and Class II of left molar relationship.

Primary impressions were performed using alginate impression (Kromopan, Lascod, USA) for study models.

Bite registration was recorded using vinyl polysiloxane (VPS) impression material (Exabite, GC America, USA). The details record of upper and lower teeth also were recorded before tooth preparation. Next, a rubber dam was placed on the upper jaw for isolation to abutment teeth. Both adjacent teeth were minimally prepared for the bonding of the bridge. The tooth preparation is limited to enamel with occlusal clearance, and cingulum rest on upper left canine and mesial-occlusal rest on upper left second premolar with a large palatal bonding area (Figure 1). A chalky appearance was noted at the area of tooth preparation after acid etching (Figure 2). Then, an upper impression was recorded using light body VPS impression (Examix, GC America, USA) and soft putty (3M ESPE, USA) with the stock tray. The impression was sent to the laboratory for a working model. Figure 3 shows the die spacer applied on the surface preparation on abutment teeth.



Figure 1: Intra-oral occlusal view after preparation of abutment teeth.



Figure 2: Chalky appearance after acid etching



Figure 3: Extra-oral view of maxillary model.



Figure 4: Occlusal view of a resin-bonded bridge.



Figure 5: Fitting surface of a resin-bonded bridge.



Figure 6: Intra-oral postoperative view.



Figure 7: Intra-oral postoperative labial view.

The fitting surfaces of the bridge retainers (Figures 4 & 5) were then applied with dual-curing resin cement (Panavia-F, Kuraray Medical Inc, Japan) to bond to the tooth structure. After cementation, the excessive cement must be cleared, and recheck the occlusion. Figure 6 shows the intra-oral postoperative view. The patient was given post instruction on cleaning under the bridge accordingly. At the follow-up session, the patient was delighted with the treatment outcome (Figure 7).

Discussion

In treating this patient, the treatment options considered was a removable partial denture, a resin-bonded bridge, and a dental implant. A resin-bonded bridge was preferred because it is fixed restoration with minimal preparation and is more economical than a dental implant [5].

The principle of tooth preparation [6,7] is to cover as much enamel surface [8] as possible without compromising occlusion, esthetics, or periodontal health [9]. Therefore, patients' selection and expectations are important [10]. Furthermore, a design must be thoroughly planned, for example, a diagnostic wax-up of the proposed bridge [11]. Creating minimal space is required by preparing the abutment teeth to increase the bonding surface of the resin-bonded bridge. Optimizing the fitting surface attached to the

tooth structure is essential to improve the bridge's longevity [12].

Another design concept is to consider, such as the path of insertion and proximal wrap or grooves for posterior teeth such as an upper premolar tooth. The design involved occlusally with the occlusal rest. The framework was extended high on the cuspal slope without interfering with occlusion. However, there is the various design [13] of the bridge depending on the position of the tooth [14,15], remaining tooth structure, consideration of the ceramic [16,17], and adhesive systems available at present [18]. Nevertheless, the survival rate of resin-bonded bridge remains uncertain [19,20].

Conclusion

Case selection, bridge design, and clinical and laboratory procedures may become the important factors increasing the outcome. In this particular case, the bridge was successful because of various tooth preparation designs.

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Conflict of Interest

The authors are unaware of any conflict of interest in publishing this work.

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